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An Account of some Books.

I. *ELEMENS des MATHEMATIQUES, ou Principes Généraux de toutes les Sciences qui ont les Grandeur pour Objet ; par J.P. A Paris, 1675.* in quarto.

THe Author of this Work makes it his business to deliver a short and easie Method to compare *Quantities*, and to discover their Proportions and Relations to one another by Characters of Numbers, and Letters of the Alphabet ; affirming to have here demonstrated things in a Geometrical order, and rendered the *Algebraical Analysis* much easier , and treated the same more fundamentally than hath been done hitherto.

By *Quantity* he understands here not only the Extension in length, bredth and depth , but whatsoever we conceive to be capable of more or less, and that can be exactly measured, whether it be exactly known, or supposed such. Thus Time, Weight, Celerity, and even the Sensible Qualities, the Degrees of Perfection, being capable of more or less, are, to him, the *Object* of the *Mathematicks*. For, *faith be*, if you do exactly know these perfections and qualities, you may compare them in order to know exactly their proportions, and if you do not know them exactly, you may compare them by supposition: For, if you know, that a piece of Iron (e g.) is four times heavier than such a piece of Wood; by supposing that Wood is a thousand times weightier than Air, you may conclude by this supposition, that the Iron is 4000 times heavier than Air.

He considers, that though *Arithmetick* be a Science from which all others depend ; yet 'tis this *Algebra*, which serves to elucidate, extend and perfect, as much as is possible, *Arithmetick*, and generally all the Sciences that relate to the *Mathematicks* : It being so general, that it considers all *Quantities*, and what it demonstrates being capable to be applied not only to Numbers Lines and Figures, Weights and Velocities ; but also to all *such* Numbers, Lines, Velocities, and particular quantities, as you can conceive in each species of *Quantities*.

But 'tis not only the Extent and Universality of *Algebra*, for which he commends it ; but also the Facility it affords to the mind of discovering the most hidden Verities, and which 'tis impossible to manifest by ordinary *Arithmetick* and *Geometry*, or by the aid of any other Science ; since it not being possible to give to our understanding a greater extent and capacity than it hath, this Science only teaches to manage it, by representing to it under very short expressions an Aggregat of many Ideas, by taking it up so little by the senses

senses that it leaves it in a manner altogether to it self, and by assisting it to run through all the proportions of Quantities which it examines, in a dextrous, expedit and easie manner: So that nothing escapes the understanding in the subject under consideration; and the clear and distinct neatness of its ratiocinations alwaies discovers to it the shortest way of researched Truths, as many of them as it can come to know, or the means which it wants to attain them, if it cannot know them.

He takes notice, that, there being particular Sciences that depend from *Geometry*, there are those that consider the same as the general Principle of all knowledge: And that, forasmuch as *Geometry* is pleasing enough by reason of the Figures that fall under the Imagination, there are many that do inconsiderately prefer it to *Algebra*; and that they imagine withal, that the Geometrical Demonstrations by Lines are the only true ones, because they make themselves as 'twere sensible. To this he saith, that he is not ignorant, there are things peculiar to *Geometry* that must be known and demonstrated by Figures; but that, to handle this Science as it ought, we are often obliged to make use of *Algebra*, and that, because the proofs thereof are the most general and the most simple, they are therefore to be accounted the most Natural Demonstrations.

And if it be objected, that Incommensurable Quantities cannot be discovered nor expressed by Numbers, but they alwaies may by Lines, and so *Geometry* is more exact and of a greater extent than the Science of Numbers: He answers, 1. That Incommensurable Quantities may alwaies be expressed by Incommensurable Numbers; and if the Incommensurable Numbers are not altogether known, 'tis because the Incommensurable Quantities, implying somewhat of infinite and incomprehensible, are not capable of being fully known. 2. That Lines are never the true expressions of Incommensurable Quantities, nor even of the Commensurable, forasmuch as that which maketh the quantity not known, cannot be an expression thereof; and that the lines, of which the Geometrians pretend to express the unknown quantities, do not make known their quantities. He grants it to be true, that Geometrians do demonstrate, that those Lines are equal to those Quantities; but he adds, that those lines themselves are unknown to the Understanding, though they are known by the Eyes or by the Imagination; and that, if you would have expressions speaking to the Mind and not to the Eyes, you must recur to Incommensurable

numbers : So that *these* numbers are still more known than those lines, seeing they do better express and represent them to the Understanding. As (e.g.) this number $\sqrt{20}$ is much more known, than the Hypotenusa of a right angle of which the sides are 2 and 4 ; for, 'tis at least known, that $\sqrt{20}$ is about $4\frac{1}{2}$; and if you will know it more precisely, you may, by the rules of the Approximation of Roots. But you *know* not the bigness of the Line that sustains a right angle, though you *see* or *phancy* it.

He observes further, that the *Analytical* (which is the principal) part of *Algebra*, is incomparably more fertil for the discovery of Truths, than Figures, and that without it 'tis in a manner impossible to resolve an infinity of Problems. For, *saith he*, how can any man *imagine* that long concatenation of embarrassing Lines and Figures, where you ought to see distinctly so many different proportions and respects, before you know what it is that the resolution sought for doth immediately depend upon.

Now, as to the Order which our Author hath observed in those Elements, they are divided into two Parts. The *first*, containing *five* books, explains and demonstrates both the Supputation with *Numbers*, which is otherwise call'd *Arithmetick*, and that of *Symbols* or *Letters*, which is called *Algebra*. The *other*, in *four* books more, explices and treats fundamentally of the *Analytical* part, teaching to resolve *Questions*, and to discover the General Truths of the *Mathematicks* ; that is to say, those which regard Quantities generally taken, yet without supposing other knowledge than what is granted ; but making use of those Operations only that are establish'd in the *first* part.

In the *first* book of all, the Author shews, that an *Unit* and *Numbers* are the sole *Idea's*, by which we can regulate the measure of Quantities, and exactly determine what is knowable of them. And after he hath explained the fundamental *Idea's* that serve us to compare quantities amongst themselves ; he teaches in the sequel of this book the four first Operations that are made by *Numbers* or Entire quantities, which are considered as Proportions, whereof the first term only is expressed, and the second, which is alwaies an *Unit*, understood.

The *second* book is of the same Operations upon *Fractions*, which are Proportions of quantities, of which every term is expressed.

The *third* is of Powers and their Resolutions, whereof all the Rules are included in one only Problem, by means of a *Table* that represents in an *Epitome* all those Rules with their Demonstration,

tion, after a manner that is not less general than simple and easie to understand.

And since this Resolution of the Powers doth not alwaies afford Commensurable quantities, or such as are exactly known, but sometimes Incommensurable ones; these are explicated in the *fourth* book, together with all the Operations that are made concerning them.

The *fifth* treats of the Comparison of Proportions: Which part he finds to be so vast and fruitful, and the uses thereof to be of such an extent in most Sciences, that there are few, if any, that can be well taught without it. The Geometrical Equalities and Proportions, which are one sort of the *genus* of Equalities, are the things that render this part so considerable, and for the elucidating of which our Author hath most of all employed himself in this work; and the *four* last books of the *second part* are nothing but a sequel of what hath been said of the Equalities in the *fifth* book of the *first part*.

Now in the said *four* books he settles first the Grounds of Analysis. Next, after having there given some *idea* of the method of *Diphantus*, and of that of *Vieta*, he is particular in explaining the method of *Des-Cartes*, which he esteems to be the most general, the most fertil, and the most easie of all. Yet seeing that this famous Man hath not demonstrated, nor so much as explained, all the Principles which he hath made use of, our Author intimates, that the Reader will not find in his Writings the same advantages for understanding his *Analysis*, as may be had from these Elements. For, after he hath clearly explained and demonstrated all those Principles, he thence deduces in order not only all the Discoveries made by *Des-Cartes*, but also other new and more useful ones. For it may be seen in the *last* book, that those new Discoveries furnish Rules that are much shorter than the *Cartesian*, and one may even draw analytically from them much of certain and very universal knowledge, which he did not believe could be discovered without the aid of Parabolical lines, or such other as belong to the *Geometria composita*, as the Hyperbolick, &c.

But, forasmuch as the Author esteems that these Elements are principally written for Beginners, and even such as have not so much as the knowledge of Arithmetick, he desires that such Readers would have their pen at hand, to make themselves the operations of all the different Examples, deliver'd in great number, his

aim being to accustom them to practise the Rules, and to make those things familiar and sensible to them, which at first seem to be abstract and difficult enough, especially to those that are not yet accustomed to the exercise of their Understanding. As for those that are already versed in common Arithmetick and Algebra, they, *be faith*, have discerning enough to exempt themselves from reading what they already know. Though he hopes withal, that there will be those that will not find it tedious to peruse all, that so they may observe the connexions, which possibly they had not yet observed, between all those Truths and the different parts of the Mathematicks; and to establish also their knowledge upon principles, that may perhaps appear to them more plain and more natural, and in less number than those which they have used hitherto.

II. *De l'ART de PARLER*; à Paris, 1675. in duodecimo.

AS there was printed at *Paris*, some years since, the *Art of Thinking*, (whereof an Account was given in *Numb.* 106. of these Tracts,) so there is lately published in the same place this *Art of Speaking*, of which some Description is intended here.

This Author doth not, as is ordinary, crowd his book with a heap of Precepts, whereby the Memory is burthen'd and the Mind embarrassed; but, like a good philosopher, makes it his chief business to teach the Ground of the Art he treats of, and its Natural Principles, which being well known, there needs not that multitude of Rules, which slip out of the Memory almost as soon as they are entred.

Now to make the Reader comprehend the true Reasons of the *Principles* of Rhetorick, he begins with explaining, How Discourse comes to be formed; and there being nothing better than Nature her self to teach us the form that our Words ought to have for expressing our Thoughts and the Motions of our Will, he represents to himself a Troup of Men newly born and that never have spoken before. He considers what these Men would do: He shews, that being soon tired with expressing their mind to one another by *Gestures*, they would quickly find the advantage of *Speaking*, and form a Language to themselves: He inquires, what form they would give to that language; and in this inquiry he laies the Foundations of all languages, and renders the Reason of all the Rules prescribed by Grammarians; shewing that this research is very

very useful to learn Languages with more ease, and to speak them with more exactnes. And having made these New Men act their part, he declares, what hath been the true Origin of Tongues, and that 'tis not Hazard that hath made men find out the Use of Speech; yet shewing withal, that Speech is subject to mens Will, and that Custome or the common Consent of men exercises an absolute power over *Words*: Whereupon he gives Rules to know which are the Laws of *Custome*, and to observe them, after he hath instructed his Reader which are the Laws prescribed by *Reason*. And these are the Contents of the *first* of the *Four* parts of this Book.

In the *second* part he observes, that the most fertil Languages are not able to furnish terms proper to express *all* our Idea's, and that therefore we must have recourse to Art, borrowing terms from things that are in a manner alike, or have some connexion or relation with those that we would express, and for which the ordinary use doth not afford us proper words: Which borrowed Expressions are called *Tropes*; of all the kinds and uses of which he treats at large. In the same part he takes notice, that as Nature hath so dispos'd our Body as that it falls into postures proper to shun what may hurt it, or into those that are fittest to receive what may do it good; so the same leads us to take certain turns in speaking, capable to produce in the minds of our hearers the effects we desire, whether it be Meekness or Choler, Hatred or Love: Which terms are called *Figures*; of which the Author treats with a particular diligence, not being content to give us their Names with some Examples, (as is vu'garly done) but also teaching us the Nature of each *Figure*, and the Use to be made thereof.

Next he considers in the *third* part, that forasmuch as the facility with which men speak, and the pleasure that a discourse well pronounced begets, have brought men rather to make use of Speech to signify their thoughts, than of any other Sign; they have therefore studied to find in the ranging of Words, that which makes a discourse to be utter'd more easily, and to be heard more delightfully. And hereupon the Author enlarges himself by shewing, what is to be avoided, and what is to be observed in the disposition of the words to facilitate the Utterance and to please the Ear. And here it is that he treats of the composition of Periods and of the Art of Versification; and having shewed what it is that can please the Ear in the sound of words, he adds, how the Rules prescribed by Masters for composing Periods and making Verses in all langua-

ges, have made for their end the rendering the delivery easie and pleasant.

In the fourth part he treats of *Styles* or *Manners* of speaking, diversified according to the several inclinations and natural dispositions of Men. Here he proposes his advice for regulating a *Style*; and, because every matter must be handled in a way suitable to it, he teaches how to raise or depress, sweeten or asperate a style according as the nature of the Subject requireth. On which occasion he examines the quality of the *Style* of Orators, Poets, Philosophers, Historians.

He concludes the Book with giving us a very fair *Idea* of the *Art of Perswading*, which is very different from the *Art of Speaking*, in regard that not all those that speak well know the secret of gaining hearts.

In the whole, and particularly in the discovery made of the nature of the *Art of Rhetorick*, there are to be found considerable reflexions upon our *Mind* (of which *Speech* is an Image,) which may contribute not a little to bring us to the knowledge of our selves. And every Curious Spirit will doubtless be pleased to learn to know the reasons here given of all the Rules, which the *Art of Speaking* prescribes; This Author, when he treats of what it is that pleaseth in a discourse, not contenting himself with saying 'tis *something I know not what*, but naming the very thing, and leading the Reader to the very source of that pleasure, and making him understand the very principles of those Rules, which those do follow that give delight in Speaking, &c.

III. *The manner of raising, ordering and improving Forrest Trees:*

Also how to plant, make and keep Woods, Walks, Avenues, Lawns, Hedges, &c. with several Figures proper for Avenues and Walks to end in; and convenient Figures for Lawns: Also Rules and Tables, shewing How the ingenious Planter may measure superficial Figures; With Rules, How to divide Woods and Land; and how to measure Timber and other Solid bodies, either by Arithmetick or Geometry, &c. By M. Cooke; in quarto.

1. **I**N former Times, not only Princely and Noble Palaces, and Seats of Honour, but also generally the Mansions of the Gentry, all over *England*, were adorned with *Groves* on the next Hills;

Hills; and, in nearer approaches, with goodly rows of sturdy Oaks, tall Elms, huge Chesnuts, and other stately Trees of *English* production: To defend the Avenues, Gardens, Orchards, Walks and Ridings from violent Winds and Storms in the roughest seasons; and for cooling refreshments in the Heats of Summer: And this was a credit and shelter in all fair *Villa's*, which are said to be more in *England*, than on so much ground of any other part of *Europe*. And it was believed, that these long-liv'd Vegetables had some affinity, congruity, congeniality or propensity to sustain, cherish and lengthen the lives of Mortals; and to have somewhat of the nature of *Perennial Fountains*; to retain (roundabout them) a degree of Warmth in Winter *Frosts*, and of coolness (beside their shades) in Summer Heats. Of Gardens and Orchards Mr. *J. W* saith, p. 147, 148. *The exercise of Planting, Graffing, Pruning and Walking in them, very much tendeth to salubrity, and to cure several distempers incident to our Natures (as hath been experienced,) and towards the prolongation of life.* And if any of these Vegetables participate of the nature of *smoaking Fountains*, it may reasonably be apprehended, that they may attemper and mitigate the extremities of both Seasons, to be more agreeable to Humane Constitutions.

2. And 'tis a real Truth (though I must here be more sober than to mention it in good earnest,) that (sometimes) the stateliest Trees will familiarly treat, and answer distinctly to all the Discourses, Noise and Voices of the Family, from the softer whisper to the loudest raillyery, with vocal imitation. And they are so perfectly Musical, that they will keep Time and true Consonant to any Tune, from the highest Treble to the deepest Basse: And 'tis a great pleasure to the Musical (which are alwaies the best) Natures, to enjoy a Musical Habitation.

3. And seriously this Vegetable Furniture was held a *sure Mark*, to distinguish, at great distance, *Good Husbands and Hospitable Householders*, from *Wasteful and broken Consumers of their Patrimony*.

4. And much is done lately, both for Ornament and Healthfulness, about the Amenities of the Royal Palaces, and of many other chief Mansions, by planting the most beautiful, wholesome and verdant Trees, in all their Avenues, Walks and Ridings.

5. And much more may yet be done for the Credit and Reputation, as well as for the healthfulness and pleasantness of *England*, if we proceed to follow the best examples, for places of Ancient Honour;

Honour, for Cities and Towns; and especially for both our Famous Universities, where they have many Colledges with spacious Walks and fair Gardens.

6. And for our choice of the most convenient Plants, ingenious *Muffet* (in his third Chapter of *Healths Improvement*) learnedly instructs us, by the experience of many Ages and Nations, to avoid some Plants of a noxious and poysinous breath, and to adopt Health-breathing Plants; of which benign kind great variety is now found by many Trials to agree with our Soyl and Climate. So that our *Universities* have no necessity to yield to the Reputation of *Leyden* for their *Aquatic Arbors*, since ours may soon be furnished with more wholesome, beautiful and fragrant Blossoms and Evergreens. And more Essays grow on apace.

For all these Concernments, I could do no less than give publick notice of the seasonable Aids and Encouragements herein afforded by this our skilful and industrious Author.

Postscript.

If among their Adorning-Trees due care be had for the planting of Mulberry-trees, in the approaches of Cities and Towns, they may do well in time for many Poor in England; as the care for the same hath brought a vast Treasure into France.

IV and V. *The French Gardiner reprinted; to which is annexed the English Vineyard vindicated, and the Way of making and ordering Wines in France, &c.*

For another Concernment I must again give notice, that *The French Gardiner*, which gives proper Instructions for the culture and propagation of the best Esculent Plants, (which are yet much wanting in *England*,) is reprinted in a *third Edition*, Illustrated with Sculptures: To which is annexed, *The English Vineyard vindicated*; and, *The Way of making and ordering Wines in France*: in octavo. Sold by Mr. *Tooke* at the Ship in *Paul's Church-yard*.

“ The Fruits of the Earth, and especially of Trees (saith Mr. J.W. p. 148.) were the first food ordained for Man to eat; by eating of which (before Flesh became his meat) he lived to a greater age than any since have been observed to have lived.

Errata in Numb. 125.
P. 602. l. 32. for *your* read *the*, ib. l. 36. r. *singeing*.

London, Printed for *John Martyn*, Printer to the *Royal Society*,
at the *Bell* in *St. Pauls Church-yard*. 1676.